

CLAIMS

What is claimed is:

Sub
A1

1. An iterative computer-implemented process for creating an entity that approximately satisfies a design requirement that at least one characteristic is not in the prior art, the process invoking iterations, each iteration comprising
 - selecting at least one candidate entity, wherein selection is more likely for a candidate entity that satisfies the design requirement to a greater degree than another candidate entity and for a candidate entity that avoids prior art to a lesser degree than another candidate entity; and
 - creating at least one new candidate entity by creating a variation in the at least one candidate entity.
2. The process defined in Claim 1 wherein creating at least one new candidate entity comprises mutating the at least one candidate entity.
3. The process defined in Claim 2 wherein selecting the at least one candidate entity is performed by simulating annealing.
4. The process defined in Claim 2 wherein selecting at least one candidate controller is performed by hill climbing.

1 *Added.*
2

5. The process defined in Claim 1 wherein the at least one candidate entity is a member of a population of entities.

- 1 6. The process defined in Claim 5 wherein creating at least one new
2 candidate entity comprises performing a crossover operation among a group of
3 candidate entities, the group of entities comprising the selected entity and at least one
4 other entity from the population, the at least one new coordinate entity created by
5 crossover comprising at least a portion of the selected entity and at least a portion of
6 that at least one other entity.

- 1 7. The process defined in Claim 1 further comprising performing genetic
2 programming operations.

- 1 8. The process defined in Claim 1 further comprising genetic algorithms
2 operations.

- 1 9. The process defined in Claim 1 wherein the at least one of candidate entity
2 comprises at least one externally invokable sub-entity and at least one internally
3 invokable sub-entity, the at least one externally invokable sub-entity capable of
4 including at least one invocation of the at least one internally invokable sub-entity.

10. The process defined in Claim 9 wherein the at least of candidate entity

comprises at least two internally invokable sub-entities and wherein at least one of the

at least two internally invokable sub-entities includes at least one invocation of another

of the at least two internally invokable sub-entities.

11. The process defined in Claim 9 wherein the at least of one candidate entity

has at least one internally invokable sub-entity that includes at least one invocation of

itself.

12. The process defined in Claim 1 wherein creating at least one new

candidate entity comprises performing an architecture-altering operation involving at

least one internally invokable sub-entity of the at least one selected entity.

13. The process defined in Claim 1 further comprising creating the at least one

candidate entity by a random process.

14. The process defined in Claim 1 further comprising supplying, from an

external source, the at least one candidate entity partially satisfying the design

requirement or that only partially reads on the prior art.

Ally
conty.

15. The process defined in Claim 1 wherein selecting a candidate entity that more closely satisfies the design requirement is ascertained by evaluating the candidate entity by simulating the candidate entity.

16. The process defined in Claim 1 wherein selecting the candidate entity that more closely satisfies the design requirement is ascertained by evaluating the candidate by observing a physical realization representing the candidate entity.

17. The process defined in Claim 1 wherein the candidate entity conforms to a constrained syntactic structure.

18. The process defined in Claim 1 wherein the candidate entity comprises an electrical circuit.

19. The process defined in Claim 1 wherein the candidate entity comprises a controller.

20. The process defined in Claim 1 wherein the candidate entity comprises an antenna.

1 21. The process defined in Claim 1 wherein the candidate entity comprises a
2 mechanical system.

1 22. An iterative computer-implemented process for creating an entity that
2 approximately satisfies a design requirement that includes technical requirements and
3 dissimilarity to preexisting technology, the process invoking iterations, each iteration
4 comprising:

5 producing a structure;

6 determining behavior and characteristics of the structure;

7 comparing the structure to preexisting technology;

8 determining fitness of the structure by combining compliance with the technical
9 requirements and dissimilarity to preexisting technology.

add
out